

# The Influence of Core Strength of Basketball Training on High School

Huihua Chen

Bachelor's Thesis  
Degree Programme in Sport  
Coaching and Management  
2019



# Abstract



Date 2019

<b>Author(s)</b> Huihua Chen	
<b>Degree program</b> Degree Programme of Sport Coaching and Management	
<b>Report/thesis title</b> The Influence of Core Strength of Basketball Training on High School	<b>Number of pages and appendix pages</b> 29+2
<b>Abstract</b> <p>Basketball is becoming more and more popular in China, many students also tried to participate some professional basketball training as well. However, how to improve the physical fitness of basketball players proves to be the key problem that not only coaches have attached to the great importance, but also players need to be pay much attention as well. Apparently, in basketball high antagonism determines the strength that the basic physical ability of basketball players should ,on the basis of strength, speed, flexibility, bounce and other qualities can then be joint together to reach the peak performance. In recent years, more and more new ideas and methods have been applied to basketball training. Among them, the core strength training is one of the new ideas that arouse the coaches great response. The core strength training plays an important role in stabilizing the center of gravity, conduction force and so on. In the basketball match, the athlete must unceasingly face the instantaneous change situation and must promptly make the response, the quick response action. Therefore, the developed limbs strength and the outstanding core strength becomes the basketball players' physique foundation.</p> <p>This study takes the core strength training as the research object, through to the experimental object joins the core strength training method, and discusses the influence of core strength training on the teenager basketball players. This study uses the literature, statistics method as well as the experimental method to carry on the investigation, the analysis core strength training and the basketball technique relations.</p> <p>The study indicated that the core strength training and the basketball technique has the remarkable difference, the core strength training does enhance the basketball technique.</p>	
<b>Keywords</b> Core strength training; strength training; Basketball technology; Basketball	

## Table of contents

1. Introduction.....	1
1.1. Research background .....	1
1.2. Purpose of research .....	1
1.3. Research significance .....	2
2. Literature review .....	3
2.1. Conceptual definition of core strength .....	3
2.2. Domestic research on core strength training .....	3
3. Domestic research.....	6
3.1. Core Strength Training.....	6
3.2. Traditional strength training.....	6
3.3. The difference between core strength and traditional strength training.....	7
3.4. Impact of core strength training on the basic skills of basketball.....	8
4. Foreign research .....	10
4.1. Core area.....	10
4.2. Core Forces .....	10
4.3. Core stability .....	11
4.4. The difference between core strength and core stability.....	12
5. Comprehensive statement.....	14
6 Research object and method.....	15
6.1 subjects of study .....	15
6.2 Research methods.....	15
7 Analysis and discussion.....	16
7.1 Test and analysis of the difference of core strength data before and after the experiment in the experimental group .....	16
7.2 data analysis of the control group and the experimental group after the experiment.....	17
7.2.1 Analysis of test results of the control group and the experimental group after the experiment.....	18
8 Conclusion and recommendation .....	21
8.1 conclusion.....	21
8.2 Recommendation .....	22
List of references.....	23

# **1. Introduction**

## **1.1. Research background**

Basketball has become one of the most influential and competitive sports in the world because of its fierce antagonism and rapid transformation of attack and defense. Basketball is a kind of antagonistic sports with both skills and physical fitness, which is dominated by skills. The rational use of all kinds of technical movements requires athletes to support them with good physical quality. With the rapid development of basketball in the world, participants are required to have a higher level of explosive power, endurance, balance, strength, speed, sensitivity and other physical qualities, so physical training is one of the basic training contents of basketball. A good physical fitness level is a modern basketball player must have the premise, otherwise the good technology will be lost in the fierce physical confrontation.

Young basketball players are the future of Chinese basketball. The previous failure experience tells us that we must pay attention to the ability of physical confrontation. Therefore, we should pay attention to the training of players' physical strength in the training of young basketball players. Strength training is divided into general strength training and core strength training. General strength training is the basis of physical quality, also known as absolute strength. Through the conventional strength test, we can know, but in basketball games, we pay attention to confrontation. Confrontation must be skillful, so good general power does not gain an advantage in confrontation, and the core force is the basis for confrontation, like shooting with finger strength, air control depends on the combination of waist and abdomen strength, change direction to break through the support of ankle strengt etc. Core strenght can determine the advantage on the basketball court, so improving the core strength of teenagers has become the most important thing in physical training.

## **1.2. Purpose of research**

Core strength as a new way of modern physical fitness. It is clear that the degree of popularity in China is obviously not enough. Effectiveness and pertinence of core strength training theory quickly made it occupy an important position in the field of competitive sports. Many scholars also began to believe that core strength training can be effectively used not only in the medical field but also in all competitive sports fields. Myoelectric response studies have also shown that

core muscles responsible for hip joint motion, such as transverse abdominal muscles and multifidus muscles, are activated before the hip joint muscles before the upper and lower limb muscles. Obviously, the core muscle group is recruited in advance in order to create a good sports foundation for limb movements. In other words, core strength is the basis of human movement. Core strength must precede traditional strength training and run through the entire process of strength training. Core strength training can also stimulate the explosive power of middle school basketball players, to ensure the efficiency and quality of sports.

### **1.3. Research significance**

As a new way of modern physical training, the popularity of core strength in our country is obviously not high enough. The effectiveness of the core strength training theory makes it occupy an important position in the field of competitive sports very quickly. Many scholars also begin to think that the core strength training can be used effectively not only in the medical field, but also in all competitive sports fields. EMG studies have also shown that the core muscles in charge of hip joint movement, such as transverse abdominis muscle and split muscle, precede hip joint movement, and the muscles of lower extremities are activated. Obviously, the core muscle group is collected in advance in order to create a good exercise basis for limb movement. let me put it another way, The core force is the basis of human movement, the core force should precede the traditional strength training and run through the whole process of strength training.

This paper takes the improvement of the core strength training as the starting point, unifies the basketball basic technology, uses the core strength as the support, analyzes how to raise the basketball trainer core strength training, how to train students to use the core strength to maintain the normal technical action in basketball, so as to provide a theoretical basis for the improvement of basketball training in the future and for the improvement of the reserve of basketball reserve talents in China.

## **2.Literature review**

### **2.1. Conceptual definition of core strength**

The "core" is the middle link of the human body, that is, below the shoulder joint, including the pelvis above the hip joint, is formed by the waist, pelvis, hip joint as a whole, containing 29 muscles. (Wang & Liao, 2008 ,p.13)

Core strength generally refers to the strength of the core muscle group. The core muscle group plays the role of stabilizing the center of gravity, conduction force and so on, which is the main link of the whole force, and plays the pivotal role of connecting the upper and lower limbs to the activities of the upper and lower extremities. Strong core muscle groups play a stable and supportive role in physical posture, motor skills and special technical movements in exercise. (Zheng ,2009, p.472)

In an Analysis of the importance of core strength training to the development of basketball technology, Zhang (2017) mentioned that "the core refers to the trunk part of the body that is, the hip joint, pelvis, waist formation as a whole, is the middle link of the human body." Liu (2017) effective Strategy for Basketball players' core strength training points out that "Core strength training refers to the rigid connection of the trunk of the human body, so that the functions of all parts of the body can be effectively integrated and connected." So as to coordinate the physical strength of athletes, give full play to the leverage of the training method. "

### **2.2. Domestic research on core strength training**

#### **2.2.1. Application of core strength training in sports**

Du (2017) mentioned in "the influence of core strength training on the special physical fitness of Basketball players in Colleges and Universities" that "the current methods of core strength training in China mainly focus on seven different ways of core strength training". Zhang (2015) also pointed out in the Application and Analysis of Core strength training in Basketball training that "coaches do not make detailed, comprehensive and systematic plans for strength training, which makes it difficult to achieve corresponding results in the development of strength training." Wang and Wang (2015) pointed out in the Application of Core strength training in Basketball training that "the traditional

basketball training method has a profound influence on the way of basketball training in China, Such as the core strength of basketball physical training, in the current study of core strength training, is still in the process of low-level academic discussion, lack of a higher level of academic discussion. In fact, the research on core strength training in Our country started late, lacks the teaching and training experiences and blindly draws lessons from foreign training. However, in recent years, there are a number of related research work focus on the subject, which indicates that more and more people interested. (Kang, 2015, 2)

### **2.2.2. Application of Core strength training in Basketball**

In the Research on the Application of Core strength training in Basketball training, Jiang (2017) mentioned that "the scientific and reasonable application of core strength training in basketball training can significantly improve the coordination, sensitivity, flexibility and other sports qualities of basketball players. Clearly understand the connotation of core strength training, comprehensively analyze the significance of the application of core strength training in basketball training, combine the actual situation of basketball players, innovate the content of core strength training, and optimize the training mode of core strength. Strengthen the management of core strength training and so on, and actively promote the overall quality of basketball players." A probe into the Application of Yang (2016) Core strength training in Basketball Teaching in Colleges and Universities under the New form The training of the core strength is mainly to improve the coordination and stability of the students themselves from many aspects, so that the students' skills of playing basketball can be further improved, including dribbling, ball control, shooting and so on.

### **2.2.3. Application of Core strength training in Basketball Special physical training**

Fan (2016) mentioned in the Application of Core strength training in Basketball training, "effectively helping to complete basketball movements and ensuring that basketball players maintain a good competitive state throughout the game." Ye (2016), on the influence of Core strength training on Basketball, shows that "Core strength training can improve the physical quality of basketball players and ensure the quality of each action". Zhang (2017) the role of Core strength training in Basketball training in Colleges and Universities says that "Core strength training can effectively improve the personal level of basketball players." On the Core

strength and its training-Origin-problem in competitive Sports Development states that "the training of core forces has a good function of preventing injury, and the improvement of core forces and the stability of core parts can strengthen the protection of the weak link of the spine on the one hand."



### **3. Domestic research**

#### **3.1. Core Strength Training**

Core strength training is actually a form of strength training, and core strength actually refers to core muscles. Cardiac contraction and centrifugal ability is the process of training the core muscle system, and the core muscle group plays an important role in the stability of the body's center of gravity and the transfer of upper and lower limb strength. (Pei & Jiang,2011, 221)

The key to core strength training is actually a training method for the core muscle group and deep small muscle group in the core area to activate the deep inert small muscle group, thereby improving the stability and balance of the body. (Shao,2018, p.228) The main purpose is to train the core strength of the human body through the shallow and deep muscle groups are exercised, enhance the transfer of strength between the limb joints, so that the muscle strength coordination between the joints to enhance, speed up the pace of movement of various technical links, so that the action technology is better played.

The core strength training centers on stability and balance, which strengthens the strength of deep small muscle groups to strengthen the joints of the body. Improves the ability of nerves to regulate deep muscle groups and activates closed small muscle groups. To make the strength better in the joints, the overall strengthening of the core area of the human body spine, pelvis and hip joint stability. (Li, 2015)

#### **3.2. Traditional strength training**

Traditional strength training is in a stable state of the body, by increasing the load of some training, mainly to the body's large muscle groups, including upper and lower limbs, as well as the waist and abdomen. By stimulating the appropriate load, thereby increasing the number of muscle fibers and muscle fracture areas, so that muscle strength, speed, endurance, etc. are improved exercise. (Zhou,2018, 39 ) The main training methods of traditional troops are: suitable for load, multi-group number, high density and low speed. These exercise methods have a good effect on the increase in the strength of large muscle groups. During strength training, select the appropriate load based on the object's ability,It's not that the greater the weight, the better. Proper load

stimulation can increase muscle volume, endurance, strength and contraction speed. In the muscle strength training process, try to do as much as possible group, in the specified time for a certain part of the body to carry out special exercise, so that the number of groups reached 4-6 groups of the best results. Let the muscle get enough stimulation to allow the muscle to recover time to grow, try to make muscle speak. The muscles feel bloated and numb, and there is a significant increase in thickening to achieve the best effect of this state of movement. In the traditional strength training to achieve high density, strict control between groups of rest time, generally controlled between 30-60 seconds is appropriate. Complete the action as slowly as possible, so that muscle stimulation more obvious and profound, experience part of the force, so that the force concentrated in a certain part, to avoid the situation of force dispersion.

### **3.3. The difference between core strength and traditional strength training**

In the traditional strength training method, most of the training is carried out in a relatively stable state, must have a certain weight burden. During exercise, the posture of the body is in a fixed position, mainly for large muscle groups around the single joint rotation and contraction training. Traditional strength training stimulation can increase the number of muscle fibers and cross-sectional area, this training method for single muscle training effect is better, can increase the absolute strength of the muscle. (Liu & Liu & Li, 2018, 79)Core strength training focuses more on training small muscles and shallow muscle groups deep in the core region, most of which are exercise when the body is still supported or unstable. Exercise is more difficult, but it can improve more muscle to participate in exercise.

According to the sports characteristics of basketball program, complete any technical action, the body almost in the process of moving, and the body in the dynamic unstable situation to complete certain movements, will inevitably cause some loss of power. And the core strength training content of the setting, mostly in an unstable training state, which is more in line with the characteristics of basketball, in line with the actual situation on the field, is to make up for a capacity defect steam produced by a good way. Problems can make the force more concentrated, in the confrontation more stable control of the power sequence and movement posture. (Zhao & Zhang,2016, 37)

### **3. 4. Impact of core strength training on the basic skills of basketball**

Core strength exists in all sports, and many technical movements convey strength to the core muscle group, especially in basketball and anti-sport. In basketball, the main scoring methods are shooting and shooting, and many technical movements evolve from these two scoring methods. For example: dribbling jump shot, in-situ shot, pitching, low hand and high basket, etc. One of the most important scoring methods is to shoot. With the continuous improvement of the world basketball level, basketball technical difficulties are getting higher and higher. In order to better avoid the defense, shooting more stable, now most professional basketball players have taken the complete way of attack, this shooting method can get higher shooting points, shooting stability is higher, hit rate will be improved, Defensive interference is greatly reduced. Completing the jump shot action requires higher strength of the core part of the body, and in various postures of the body, high-quality shooting action can be completed through the power control of the core area. (Zhao & Zhang,2016, 37)

In the current relevant research, practice has proved that the training of core strength can improve the coordination and stability of basketball players' jumping action, speed up the shooting speed according to the actual situation of defense, and strengthen the shooting. The core muscles of the waist and abdomen when jumping to stabilize the spine. Can enable the body in the unstable or loss of center of gravity to maintain the balance of the body, improve the body's control and balance, so that the body in different postures, can maintain coordinated hair force and stable shot. (Jiao & Zhang, 2015, 35) In college basketball training, through the core area muscle strength training, can make the upper limb and lower limb strength more coordinated, force from the lower limb slow lower limb transfer faster, will have a certain impact on the jump shot rate. When jumping up a shot or layup, the stronger the core strength of the body control the better, in the body lost center of gravity or insufficient hair force, through the body's core part of the deep and shallow muscle interaction, give the body a short-term strength support, can prevent the lack of strength caused by the action deformation, to avoid the center of gravity instability caused by unnecessary damage.(Fang,2016, 31; Zhao & Duo & Chen 2018, 32)

Some strength training can enhance muscle strength, improve the sensitivity and coordination of lower limb movement, and achieve faster movement. In the course of the movement and speed of the ball, the body's center of gravity can be rapidly changed, through the interaction of muscle contraction within the body, in the course of movement from slow to fast or emergency stop, can quickly shift the body's center of gravity, high-quality completion of action. In the course of the confrontation basket, the body is in an unstable or unbalanced state, with the intervention of external forces, by shrinking small muscle groups, you can maintain the stability of the torso, so that the body posture is controlled, through the transmission of core area forces, successfully complete the basket action. Through core strength training, the muscles and ligaments can be stretched in the new range, so that the small muscle group at the joint remains stable, in the exercise to improve the amplitude of movement, reduce some unnecessary damage, activate the deep small muscle group, can be more efficient in the short time to complete the action, enhance the athletes in the exercise performance in the competition.

## **4. Foreign research**

### **4. 1. Core area**

The definition of the core concept has many differences between domestic and foreign experts, but the views are generally the same. The core part of the human body is mainly composed of hips, back and abdomen, in the combination of upper and lower limbs play the role of upper and lower limb joints and muscle joints, and give the support of the whole body, is the central link of the human body in the activity, in the human body has a very important role. (Tracy Morga Handzel, 2003, 26)

Core refers to the body's lumbar vertebra, pelvis and hip joints formed as a whole, these parts are closely related, the body in movement or rest, these parts of the muscles work together to maintain the balance and stability of the body movement. Core muscles are small layers and deep muscle groups that connect to the back, abdomen and pelvis, there are mainly abdominal muscle groups, hip muscle groups, spine, and pelvic groups. (Fredetick Sonm & Moore T. 2005, 25)

The activity of the human body is completed by the whole body, the core area is connected with the upper and lower parts of the human body, and the core area is the whole, which can not only improve the stability of the body, but also increase the body's exercise intensity. When our upper and lower limbs do certain movements, these core muscle interactions keep the body stable and control unstable movements, i.e. stable center of gravity also conduct force, allowing the muscles to coordinate their hair rapidly. (Guo & Wang & Yao & Qi, 2010, 120)

### **4. 2. Core Forces**

Core strength refers to the core muscle group in the stable center of gravity on the basis of the production and transmission of power, to develop the neural domination and control ability as the main purpose of the power ability. The core

strength is an important part of the human body force system corresponding to the strength of the limbs, is the main link of the overall force, plays a key role in the work force of the upper and lower limbs, and is the main source of motivation for human movement. (Fredetick Sonm & Moore T. 2005, 25)

The core strength is in fact the core area of the human body, the nervous system regulation with the strength of the overall muscle contraction. Core forces are important both in human dynamics and static activities. In doing some action, the core strength is an important part of the overall power, the stronger the core strength in the movement of the body posture and technical movement slower stability. The better core strength, the more muscles participate in the movement, so that the body's center of gravity is well controlled, maintain the balance of the body, control the instability of the movement, there will be no excessive dispersion of force, in doing a certain action can be more rapid transmission of strength, so that the strength of stable high-speed transmission, high-quality completion of certain movements . (Paul J Goodman, 2004, 10)

#### **4. 3. Core stability**

Core stability is the human body in the movement, through the core muscle interaction to maintain the stability of certain movements, so that the muscles of the limbs better hair force, so that the transfer of the strength of the limbs to create conditions, so that the stability of the body's center of gravity to provide a reasonable posture. The earliest concept of core stability comes from the theory of human anatomy and physiology, and most of the application of core stability is in the field of human rehabilitation. The concept of core strength comes from core stability, which is achieved through the stability of the spine. The stability of the spine is achieved by the joint control of the spine, muscles and nerves. (Hasgegawa, I. 2005, 15)

When people do some movements, they are done by our limbs, but the beginning of the movement does not start at the limbs, but at the center of the body, that is, the core area of the body. For example, our torso, which is the mainstay of the whole body, is also the center of life and movement. Only by maintaining the stability of the structure and function of the pillars can the health of the organs and other parts of the body be protected. Therefore the strength of the struts is the basis of the movement, specifically the stability of the trunk,

hip and shoulder joints, which provide the central axis of motion. If there is a problem with the central axis connecting the limbs, it is impossible to complete a powerful action. ( Liu, 2011)

At present, the core stability plays an important role not only in the medical field, but also in sports training and daily activities. Different disciplines for core stability have different expressions. In sports biomechanics, core stability is the combination of bones and ligaments. In order to prevent excessive bending of the trunk under large load, the torso bending is kept constant. The ability to withstand a certain load within the scope. In the medical field, the core stability is the structure of the waist, pelvis and hip joints, the endurance level and strength level of some specific muscle groups. The descriptions of these two subject areas indicate that the stability of the core of the human body, including the waist, pelvis and hip joints, can stabilize the spine, avoid imbalance of the spine, and keep the entire body of the body stable. The core stability is the stability of the joints of the waist, pelvis and hip joints when the human body is in motion. Through the transmission of power, it regulates the center of gravity and body posture of the trunk above the lower limbs and hip joints, and promotes the ability of the muscles to perform optimal contraction, enabling the power to transmit efficiently and in a short period of time.(Feng & Yuan,2009, p.60)

#### **4. 4. The difference between core strength and core stability**

Power is produced when the nervous system receives stimulation and produces excitement. The generation of power is a process of conduction. Stability is the ability to control the movement and strength of the body through stable internal contraction of the muscles. If the movement is unstable, the power will be dispersed and not fully exerted, thus reducing the efficiency of the movement. Therefore, the relationship between the two is mutually reinforcing and inseparable.(Chen & Chen,2008 p.112)

The core stability is that in order to control the stable posture of the muscles in the trunk and pelvis during exercise, it is mainly to provide a fulcrum in the activities of the upper and lower limbs, which can make the upper and lower limbs have certain control ability during the movement. It can make the power have better control ability from the generation to the transmission process. Core stability is the ability to stabilize the muscles of the pelvis and trunk during exercise to optimize the generation, transmission, and control of strength.(Zhang

& Li & Xu,2015, p.76) During the exercise, the contraction of the muscles in our body's trunk and pelvis is less obvious, and it does not directly complete the movement instructions. Rather, it forms a fulcrum for the contraction of the upper and lower extremities muscles through the stable contraction inside the muscles, so that the strength of the overall muscle contraction can be improved. A stable fulcrum not only coordinates the movements between muscles, but also speeds up muscle contraction and enhances the rate of physical activity.

Through the training of muscle strength in the core area, the stability of the internal muscles is improved, and the ability of the nerves, bones and muscles to control the movements is enhanced. The body maintains a certain posture in unstable conditions, maintains the balance of the body by constantly adjusting the center of gravity and posture, increases the load of the core muscle group, and enhances the stimulation of the muscles. (Wang & Liao,2008, p.12)Core strength is the ability of the upper and lower limbs to control the core strength of the body through the production and conduction of muscle contraction during exercise. Core stability refers to maintaining muscle vapor in the core area, maintaining body balance, controlling the body's center of gravity, so that the upper and lower limbs of the strength can better transfer ability, through core strength training can improve the stability of the body's core.



## **5. Comprehensive statement**

In basketball, athletes should not only compete with their opponents with skill, rapid and agile reaction and explosive force, but also compete with their opponents with the strength of their bodies and limbs. The situation changes rapidly on the field, and the athletes must react in a timely manner. The core strength can make the torso combine the upper and lower extremities, effectively connect the muscles of the whole body, and burst out the maximum efficiency of the muscles. At present, in the technical movements such as quick stop shooting, dribbling breakthrough, rebounding, attack and defense conversion, etc., the core strength can make the torso combine with the upper and lower limbs, effectively connect the muscles of the whole body, and burst out the maximum muscle efficiency. Many new ideas and methods are gradually applied to basketball training. The core strength training is mainly based on strengthening the strength of the core area of the human body. After stabilizing the center of gravity and conducting the force, make the corresponding technical action quickly.

## **6 Research object and method**

### **6.1 subjects of study**

This paper mainly studies the influence of core strength training on basketball technical movements. This article is mainly Guangzhou Middle School basketball team members for the experiment, a total of 20 people. They were randomly divided into experimental group (n = 10) and control group (n = 10).

### **6.2 Research methods**

#### **6.2.1 Documentation method**

According to the needs of the research content of this paper, through the online library of Jiaying University, we enter the China knowledge Network to search and consult, and use the key words such as "Core strength training, Basketball Technology, influence" to carry on the retrieval. To consult the literature related to the influence of the training of core forces on basketball technology; And borrowed the reference books related to the research content in the university library of Jiaying University. On this basis, the references and books are sorted out / summarized and analyzed and summarized. In the process of choosing the topic, a lot of reference is made to the influence of core sports training on basketball technology in other colleges.

#### **6.2.2 Data analysis**

Excel was used to screen and process the different data collected, and the conclusions were analyzed and compared.

#### **6.2.3 Experimental method**

The experimental method is designed according to a certain causality hypothesis. Under the condition of height control, some factors are artificially manipulated to verify whether there is a certain causal relationship between the two phenomena. As a specific research method, the experimental method involves three pairs of basic elements: independent variables and dependent variables; pre-test and post-test; experimental group and control group.

Therefore, this paper formulates the core strength training plan of the experimental group, the experimental group carries on the nuclear strength training program, the contrast carries on the traditional general strength training,

altogether 8 weeks 16 training classes, After 16 sections, the basketball special quality and basketball special technical test were carried out between the experimental group and the control group, and the test results were compared. At the same time, the training effects of the experimental group and the control group were compared horizontally. Whether there is a significant difference in the amplitude of increase, through observation and data analysis, the conclusion is drawn.

## 7 Analysis and discussion

### 7.1 Test and analysis of the difference of core strength data before and after the experiment in the experimental group

On the test of running one-foot height, the difference was 0.15 m,  $P < 0.05$ , and the difference was 2.9 s,  $P < 0.05$ , there was significant difference in the test items of variable distance return running, and there was a significant difference between before and after the test of running with one foot,  $P < 0.05$ , and there was significant difference between before and after the test. On the sitting body flexion test, the difference was 3.94 cm,  $P < 0.05$ , and the difference was 0.81 s,  $P < 0.05$ , with significant difference in the cross change direction test item, and the difference was 3.94 cm,  $P < 0.05$ , and there was significant difference between before and after the test item,  $P < 0.05$ , and there was a significant difference between the two groups ( $P < 0.05$ ). The above data show that after adding core strength training, the scores of pre-test and post-test in the experimental group are improved, and there are significant differences.

project	Pre-experimental data	Post-test data	Difference	P value
30m Stand-Up Start	5.11s±0.2	4.61s±0.15	0.50 s	P<0.05
Run a single leg to touch high	2.86m±0.17	3.01m±0.19	0.15m	P<0.05

Variable distance shuttle run	32.2s±1.03	29.3s±1.02	2.9s	P<0.05
Sit and reach test	10.82cm±2.49	14.76cm±3.24	3.94cm	P<0.05
Cross changes to run	10.45s±0.43	9.64s±0.32	0.81s	P<0.05

Table 1 Comparative data of core forces before and after the experiment in the experimental group

After 8 weeks of training, all the results of the experimental group were improved for 1 minute emergency stop. As shown in Table 2, the mean number of shots in the experimental group was 11.3 times, which was 0.9 times more than the 10.2 times before the experiment. The average number of hits was 5.6 times, which was 1.3 times more than the 4.3 times before the experiment. The average hit rate was 49.6%, 7.4% more than 42.2% before the experiment. The results showed that there was significant difference between the two groups (P < 0.05).

	Average number of shots	Average number of hits	Average hit rate
Pre-experimental results	10.2	4.3	42.2%
Post-experimental results	11.3	5.6	49.6%
D-value	0.9	1.3	7.4%
P-value	P>0.05	P>0.05	P>0.05

Table 2 Comparative Analysis of Jump shot scores in one minute before and after one minute in the Experimental Group

## 7.2 data analysis of the control group and the experimental group after the experiment

### 7.2.1 Analysis of test results of the control group and the experimental group after the experiment

There was no significant difference, which indicated that the core strength training had no change in the shooting rate of the experimental group before and after the experiment, and the scores were completely tested and recorded by the members who did not participate in the experiment. In the experiment, due to the addition of core strength training, the shooting rate of one minute jump shot increased obviously ( $P < 0.05$ ), which indicated that the core strength training was helpful to improve the shooting rate of 1 minute jump shot. Although the shooting rate of the experimental group at fixed point was improved, it was found by statistical test that there was a significant difference between the test results before and after dribbling, and the difference between the test results before and after dribbling was 1.62s. The statistical test showed that there was significant difference between the two groups ( $P < 0.05$ ), which indicated that the core strength training increased the dribbling speed.

	1 minute jump shot rate	Fixed-point shooting rate	Round trip dribbling
experimental group	49.46±6.21	52.11%±4.72	30.82s±2.6
control group	42.35%±5.78	50.81%±5.41	32.28s±1.8
D-value	7.11%	1.20%	1.64s
P-value	$P < 0.05$	$P < 0.05$	$P < 0.05$

Table 3 Analysis of test results of control group and experimental group after experiment

After 8 weeks of training, the shooting rate of the experimental group and the control group changed. According to the data of Table 3, the hit rate of the experimental group was 49.46%, and that of the control group was 42.35%. The difference between the two groups was 7.11%. After statistical analysis, there was significant difference between the two groups ( $P < 0.05$ ). In the fixed-point shooting test, the shooting rate was 52.11% in the experimental group and 50.81% in the control group, with a difference of 1.20%. After statistical analysis, there was no significant difference between the two groups ( $P > 0.05$ ). And the round trip dribbling results. There was also a gap. After the experiment, the round trip dribbling score of the experimental group was 30.82s, and that of the

control group was 32.28s, and the difference was 1.64s. It was found that there was significant difference between the two groups ( $P < 0.05$ ).

One minute jump shooting belongs to the shooting test in unstable environment, and the fixed point shooting belongs to the shooting test in stable environment. In the experiment, the core strength training content is added to the training of the experimental group, while the control group only carries on the traditional strength training. It makes a difference in training methods. After the experiment, it was found that there was a significant difference in the shooting rate between the experimental group and the control group in one point, which indicated that the influence of core strength training on the shooting rate in unstable environment was higher than that in stable environment. If you jump shot in a hurry, you need the team to complete the final shot through the control of the body and maintaining the balance of the body after take-off. The whole process of generating force is the process of firing force according to the order of each muscle group of the whole body. It needs the function of small muscle group to complete the action of emergency stop jump shooting. The coordination between lower limb and upper limb in space making, shooting is the coordination between wrist pressing and finger tapping. And the coordination of buffering and delivery when landing. Core strength training is the process of unified and coordinated training of the whole body muscles. The coordination process of shooting movements can often be trained in the core strength training. The side bridge in the core strength training, prone leg extension, hanging side knee lifting. The exercises such as hanging straight legs and so on are all carried out in unstable environment, which strengthens the physical control ability and physical stability of the players in unstable environment. Thus, the shooting rate was improved, while the traditional strength training was lack of training in unstable environment, so there was a significant difference between the experimental group and the control group after the experiment.

### **7.2.2 Analysis of core strength data of the control group and the experimental group after the experiment**

As shown in Table 4, in the comparison of the results of each test item, there were significant differences in the scores of the experimental group and the control group between the experimental group and the control group after the vertical start of the 30m station, the height of the running with one foot, the

flexion of the sitting position and the cross speed running. However, there was no significant difference in variable distance return running.

Project	Pretest data	Data after the test	D value	P value
30meter standing start	5.11s±0.2	4.16s±0.15	0.50s	P<0.05
Run up and touch high on one leg	2.86m±0.7	3.01±0.19	0.15m	P<0.05
Variable distance return run	32.2s±1.03	29.3s±1.02	2.9s	P<0.05
Sitting body flexion	10.82cm±2.49	14.76cm±1.02	3.94cm	P<0.05
Cross variable speed running	10.45s±0.43	9.64±0.32	0.81s	P<0.05

Table 4 Analysis of test results of control group and experimental group after experiment

In the course of the experiment, the core strength training was added to the training of the experimental group. After 8 weeks of training, it was found that in the comparison of the scores of the experimental group and the control group, the 30-meter station started vertically, the running-up foot was high, and the sitting position was bent forward. There was significant difference in cross variable speed running ( $P < 0.05$ ). The difference was due to the addition of core strength training in the experimental group.

## **8 Conclusion and recommendation**

### **8.1 conclusion**

1. The test results of the experimental group show that after completing the core strength training of the basketball players for 8 weeks, the experimental group stops the jump shot for one hour to reflect the basketball technical ability of the basketball players. There are significant differences in round trip dribbling and special physical fitness.

2. The test results of the control group showed that the test results of the control group were improved after 8 Zhou Chuantong training. However, there were significant differences in the scores before and after the traditional training, except for the round trip dribbling, but there were no significant differences in other events. From then on, it can be seen that the influence of traditional strength training on improving basketball skills of basketball players has not reached a comprehensive increase and development.

3. After comparing the experimental group with the control group, we found that there was no significant difference between the experimental group and the control group except fixed-point shooting and variable distance return running, but there were significant differences in the other six test items. It shows that the



core strength training is of great help to the improvement of basketball skills of basketball players.

## **8.2 Recommendation**

1. Actively explore new methods of core strength training. In the study, it is found that many core strength training methods are old. Although the current training methods can play a role to a certain extent, with the continuous development of basketball and the continuous improvement of physical quality, the original training may lose its function. Therefore, we must continue to learn, continue to study, and continue to push the core strength training to a new peak, in order to meet the needs of trainers.
2. Core strength training needs to be persisted for a long time. Like the traditional strength training, the core strength training cannot improve the corresponding muscle ability in a short period of time, it is a training process that needs to be adhered to for a long time, and must not give up halfway.
3. Different core strength training should be arranged for different positions, different height, different body shape and different action requirements, and the requirements and contents of the practice should be specific and perfect. In the core strength training, we should not get away from the basketball technical action and train the core strength for the core strength, which leads to the difficulty and unpleasantness of the core strength. The core strength training has adaptability and pertinence, and the core strength parts required by each sports are different, such as weightlifting, shot put and so on, which are different from the strength requirements of basketball. If you break away from basketball itself in training, it may lead to a lack of muscle strength in the players. The method is used correctly and the phenomenon of excessive force appears. Therefore, when young basketball players carry out core strength training, they must take basketball as the basis and develop the power to adapt to basketball, such as waist and abdomen strength, ankle strength, wrist strength and so on. Let the core strength training have full adaptability, meet the strength requirements of basketball, and maintain the stability of the basic movements of youth basketball.
4. Core strength training should be combined with traditional strength training. Core strength training is the upgrade of traditional strength training and the

connection of strength quality, but it must be supported by strength quality, and the independent core strength training cannot achieve the training goal.

## List of references

Cheng H. The application of core strength training in the training of Shandong young women's basketball team. 硕士学位论文. 山东体育学院 2013.

Chen Y.& Chen J.A Review of Researches on Core Stability Training [J]. 宜春学院学报, 2008, 30 (4): 109-124

Chen J.L. Application of core strength training in college basketball training [J]. 运动, 2016, 02

Dong W.Q. Application of core strength training in physical training of basketball special students in China's physical education colleges [D]. 西范大学, 2015.

Fredetick Sonm, Moore T. Core stabilization training for middle and long-distance runners[J]. New Stud Athl, 2005, (20) : 25-37

Fang H. Significance of core strength training to improve the ability of basketball students to take shots [J]. 当代体育科技. 2016, 6 (17): 31-32.

Feng J.J.& Yuan J.G. A Review of Studies on Core Stability and Core Strength [J]. 体育学刊. 2009. 16 (11): 58- 62.

Guan Y.J.& Ma Z.Q. Discussion on the Definition and Mechanism of Core Forces [J]. 北京体育大学学报, 2010, 33 (1): 107-108.

Guo S.T. & Wang W.X. & Yao M.X. & Qi G.T. Core Stability-Interpretation and Formation Mechanism [J]. 北京体育大学学报, 2010, 33 (8): 120-124.

Ian Hasgegawa. The use of unstable training for enhancing sport performance [J]. NSCAS Performance Training Journal, 2005, 4(4): 15-17.

Jiang S.Q.&Shi D.W. Application of Core Strength Exercises in College Sports Basketball Teaching——Taking Colleges and Universities in Guizhou Province as an Example [J]. 体育世界 (Academic Edition).

Jiao L.L. & Zhang Q. Impact of core strength training on improving the ability of basketball students to jump shots. 当代体育科技. 2015, 5 (02): 35-36.

Kang R.X. Research on the Core Strength Training Trend in Basketball Physical Fitness Training [J]. 中国学校体育, 2015, 2(05): 74-77.

Liu T.&Sun Y.Z. On the Application of Core Strength Training in Young Basketball Players [J]. 当代科技体育 2014.

Liu B. Application and evaluation of core strength training [J]. 西南师范大学学报 (Natural Science Edition), 2011, (4)

Liu Y. Research on the Influence of Core Strength Training on the Basic Skills of Young Men's Basketball [D]. 湖南科技大学硕士学位论文, 2015.

Li L.W. Experimental study on the impact of core strength training on basic basketball skills [D]. 河南师范大学硕士学位论文, 2017.

Liu R.D. & Liu J.X. & Li Q. A Comparative Study on the Training Effect of Functional and Traditional Strength Training——Based on the Lower Limb Movement Biomechanics, FMS and Exercise Ability Tests [J]. 武汉体育学院学报. 2018, 52 (05): 79-87.

Li Jianghai. Experimental research on the core strength training of young basketball players [D]. 云南师范大学, 2015.

Mao W.H. Experimental Research on the Core Strength Training of Junior Female Basketball Players[J]. 运动医学学报, 2013.05

Pei C.Y.&Jiang Q.H.&Wang J.M. Comparison of core strength training and traditional strength training theory [J]. 经济研究导刊, 2011, (06): 10-20

Paul J Goodman.Connecting the core [J].NSCAS Performance Training Journal, 2004, 3(6) : 10-14.

Wang X.J. The influence of core strength training on the special physical fitness of high school basketball students [D].烟台 : 烟台大学, 2014.

Wang Y.& Wang Y. Application of core strength training in basketball training [J]. 体育科技 2015

Wang W.X. & Liao X.J. The role and methods of core strength training [J]. 中国体育教练员. 2008, (02): 12-15.

Shao J.Y. Application of Core Strength Training in Basketball Training in Colleges and Universities [J]. 科技资讯. 2018, 16 (15): 228-229.

Yao S. Experimental Research on the Influence of Core Strength Exercise on Basketball Jumper [D]. 山东体育学院, 2014.

Zhang M. Application and Analysis of Core Strength Training in Basketball Training[J].佳木斯职业学院学报, 2017

Zhang D. Application of core strength training in basketball training in Tianjin colleges and universities [J].北京体育大学, 2016

Zhu Y.F. Brief introduction of human core muscle group and training [A]. Zhejiang Provincial Academic Meeting of Physical Medicine and Rehabilitation, (浙江省物理医学与康复学学会年会) 2011: 20-23.

Zhao P.F. & Zhang C.H. Analysis of the Importance of Core Strength in Basketball Training [J].当代体育科技, 2016,6 (18) : 37-38

Zhou Z.X. A Comparative Study of Traditional Strength Training and Functional Strength Training [J]. 当代体育科技. 2018, 8 (16): 39-41.

Zhao C.G. & Duo Z.Z. & Chen Y.Q. Research on the Influence of Core Strength Training Exercise Prescription on Basketball Shooting Hit Rate——Taking the Sophomore Basketball Specialized Students of Zhengzhou University as an Example [J].当代体育科技. 2018, 8 (06): 32-33.

Zhang Q.F. & Li J. & Xu X.Y. Theories and applications of core stability training in sports health [J]. 中国康复医学杂志. 2015, 30 (01): 76-80.